

REMARKS

Favorable reconsideration and allowance of the present patent application are respectfully requested in view of the foregoing amendments and the following remarks. Claims 11-17 are pending in the application.

Drawings

Applicants submitted a Request for Approval of Drawing Changes with the prior Response of October 16, 2002. Accordingly, the Applicants respectfully request the Examiner to approve the drawing changes.

Specification Informalities

The specification was objected to because of informalities. This Amendment addresses this objection by correcting the noted informalities in the specification. Accordingly, withdrawal of this objection is respectfully requested.

35 U.S.C. § 102 & 103 Rejections

Claims 11-13, 15 and 17 were rejected under 35 U.S.C. § 103 (a) as allegedly being unpatentable over Kunzman, et al. (U.S. Patent No. 6,054,832, "Kunzman") in view of Hewlett, et al. (U.S. Patent No. 5,812,303, "Hewlett"). Claims 14 and 16 were rejected under 35 U.S.C. § 103 (a) as allegedly being unpatentable over Kunzman, et al. in view of Hewlett, et al. and Applicants Admitted Prior Art ("AAPA"). Applicants respectfully traverse each of these rejections for at least the following reasons.

The Examiner acknowledges the deficiencies in the Kunzman reference in at least failing to teach "displaying information corresponding to the higher-order bits and

lower-order bits digital data". However, the Examiner incorporates Hewlett to allegedly remedy these deficiencies. Specifically, the Examiner alleges that Hewlett discloses NDF filters related to each RGB color segment and that the NDF segment is used to display the lower order bit. From this the Examiner concludes that one of ordinary skill in the art would combine these references and modify Kunzman's color wheel by "incorporating the neutral density filters into the color wheel, to display an image with fewer artifacts, and increasing the number of bits available for display." Applicant respectfully disagrees.

Kunzman disclose a system that uses additional white segments to improve the brightness of the display. Kunzman discloses specific considerations and a specific design to achieve this end. For example, Kunzman discloses the following in column 7, lines 16-35 (with emphasis added).

The constraints of rotation speed and flicker interact. In current designs, **each primary color has 120 degrees**. This causes flicker in the green segment at display rates of 60 Hz or less. The use of a **40 degree clear** segment 50 that is 180 degrees opposite the green segment 52, plus the reduction in size of the green segment from 120 degrees to **100 degrees**, has been proven to reduce the amount of flicker by 30%.

Even with this correction, flicker is still noticeable at frame rates of 50 Hz, as is used in Europe. The color wheel allows a 4:3 frame up-conversion. The cause of the flicker is when a frame uses only RGB because the threshold was too low to require the addition of Y, but the next frame uses a white-bit (RGBY data) on the next frame, that pixel will be momentarily very bright. This is typically observed as a wave of sparkling pixels.

A comparison of two different modes of operating a color wheel are shown below. R, G, and B designate 120 degrees of those colors. The letters r, g, and b represent 60 degrees of those colors. The letter **w** represents **20 degrees of white**, and **W** represents **40 degrees of white**.

As clearly shown above, Kunzman has a specific wheel configuration that has 100 degrees of each of R, G and B, and 40 and 20 degree segments of white. Further, Kunzman, explicitly teaches to have the 40 degree segment directly opposing the green segment. Still further, the invention of Kunzman specifically teaches "...the clear, or white (these terms are interchangeable for the purposes of this discussion), segment of the wheel is controlled independently of the other colors, as if it were one of the primary colors (red, green or blue). This allows control of the brightness for all areas of the image, making dark areas appear correctly, while not washing out the bright areas" (column 3, lines 15 -21).

In contrast, Hewlett teaches that only the three primary colors (RGB) are used with a portion of each color segment having a **lower color density**. This is explicitly stated in column 3, line 62, to column 4, line 8 (with emphasis added).

By including in the color wheel, lower density color segments within each color segment, the LSB time can be extended, allowing more bits to be used for each data sample. An example of this color wheel is shown in FIG. 2.

The color wheel, 30, **has three segments**, each with an arc length (θ_{CS}) of 120.degree.. Within each arc length is a neutral density filter of a smaller arc length (θ_{NDF}). For example, segment 32 which is blue, includes a segment of blue plus the neutral density filter, resulting in a lower density blue segment with a length of θ_{NDF} . In order to allow the neutral density region, the timing of the lower significance bits must be increase inversely proportional to the density of the NDF. The higher significance bits will be modulated as with conventional pulse width modulation.

Hewlett teaches a three segment wheel having equal portions (120 degrees) of R,G and B respectively. This is in direct contradiction to the teachings of Kunzman, which instead teaches to have at least 4 separate segments having R, G, B, Y. Further,

Kunzman teaches it is desirable to have to separate segments of white of differing sizes disposed in a particular arrangement (i.e., the 40 degree white segment directly opposite the G segment).

As stated in MPEP § 2143.01, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Further, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). As noted in the arguments above, the combination proposed by the Examiner would at least change the principle of operation of the Kunzman reference.

Further, as stated in MPEP § 2141.02, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). As confirmed in MPEP § 2145, it is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 218 USPQ 769, 779 (Fed. Cir. 1983). It clear from the references themselves, cited in the foregoing arguments, that Kunzman and Hewlett directly contradict each other as to the design of the wheel and how to enhance the image derived from the color wheel.

Finally, even if one were try and combine these references as suggested by the Examiner, Applicants respectfully submits at best the resulting configuration would have each of the R, G, and B segments include a NDF (low intensity) section in addition to the white segments. Clearly, this would not render Applicant's claimed combinations obvious as alleged by the Examiner.

Accordingly, Applicant respectfully submits that neither Kunzman, Hewlett, or the combination of these references discloses the features of Applicant's claimed combinations as noted above. Therefore, these references do not render Applicant's claimed combinations obvious as alleged by the Examiner. Further, Applicant respectfully submits that there is no suggestion or no motivation to combine the references as alleged by the Examiner. Accordingly, Applicant respectfully requests reconsideration and withdrawal of this rejection.

CONCLUSION

All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance and such allowance is respectfully solicited. Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Response, if applicable.

Appln. No. 09/887,665

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The Title has been replaced with the following new Title:

--A DISPLAY DEVICE FOR DISPLAYING DIGITAL INPUT IMAGE DATA--.